

TEMPERATURE ZONES IN A SOLID OXIDE  
FUEL CELL AUXILIARY POWER UNIT

ABSTRACT OF THE DISCLOSURE

A method for fuel cell system thermal management includes: maintaining a first zone at a first selected temperature range, maintaining a second zone at a second selected temperature range, and maintaining a third zone at a third selected temperature range. The second zone is in thermal communication with a first sensor and comprises a reformer, while the third zone is in thermal communication with a second sensor and comprises a fuel cell stack. The second selected temperature range is greater than the first selected temperature range, while the third selected temperature range is greater than the second selected temperature range. A thermal management system for use with an auxiliary power unit includes a first air control valve in fluid communication with a process air supply and a fuel reformer zone, the first air control valve in operable communication with a controller; a second air control valve in fluid communication with a process air supply and a hot zone, the second air control valve in electronic communication with the controller; a reformer zone temperature sensor in thermal communication with the fuel reformer and in operable communication with the controller; a hot zone temperature sensor in thermal communication with the hot zone and in operable communication with the controller; a first outlet at the reformer zone; and a second outlet at the hot zone.